

# WATER FILTRATION

part of **GreenGate Methodological Toolkit<sub>2</sub>**

Created within the project GreenGate<sub>2</sub>.

GreenGate<sub>2</sub> project (reg. n. 2023-2-CZ01-KA220-YOU-000174554) was co-funded by the Erasmus+ programme of the European Union.

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA).

Neither the European Union nor EACEA can be held responsible for them.

Partners:



Co-funded by  
the European Union

# Water Filtration

## INTRO

Imagine you're out in the wild with only dirty water, how would you make it clean? In this hands-on experiment, you'll build your own water filtration system! Exclaimer: not for drinking.

**Aim:**

- To simulate a simple water filtration process and observe the effects.
- Discuss the importance of clean water.

**Time:** 40 minutes

**Place:** Indoors or outdoors

**Tools:**

- ▷ 2 clear plastic bottles (2-liter)
- ▷ gravel
- ▷ sand
- ▷ activated charcoal
- ▷ coffee filters or gauze (you can use also non-woven fabric or perlan)
- ▷ rubber bands
- ▷ water container
- ▷ water pollution material (e.g. dust, dirt, food coloring)

## CORE

1. Prepare the Filter:
  - Cut the bottom off one of the plastic bottles.
  - Place a coffee filter or piece of gauze over the mouth of the bottle and secure it with a rubber band.
  - Add layers of gravel, sand, and activated charcoal to the filter, ensuring each layer is distinct.
2. Create Muddy Water:
  - Mix a small amount of dirt or food coloring into a container of water to simulate polluted water.



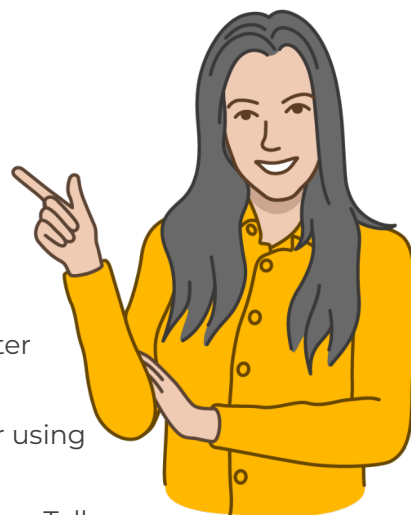
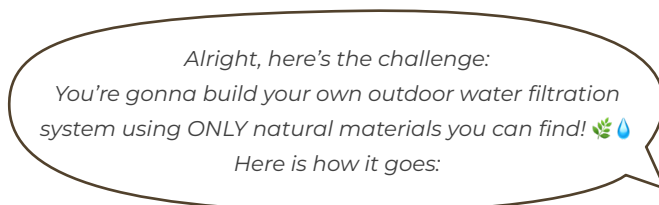
*Even if the water looks clear after filtering, IT IS NOT SAFE TO DRINK! Filtering removes dirt, but not all bacteria or chemicals. Activated charcoal can remove chlorine, some types of pesticides and herbicides, some heavy metals and odors. But in this form it is not a fully functional model.*

3. Filter the Water:

- Slowly pour the muddy water into the filter.
- Collect the filtered water in the second plastic bottle.

4. Observe and Compare:

- Compare the color and clarity of the filtered water to the original muddy water.



1. Split into groups
  2. Each group gets 2 bottles - one with muddy water and one empty
  3. Your mission? Figure out how to filter that water using nature's tools!
- Once you're done, hit us with a quick presentation. Tell us:
- What natural materials you used
  - How your system works
  - Was it actually effective?

Let's see who can make the clearest water! 🚀💡

## CONCLUSION

Discuss:

- What happened to the muddy water after it passed through the filter paper?
- Why did the water become clearer?
- What role did the filter paper and other layers play in the filtration process?
- Why is it important to purify water?
- Can you think of other ways to purify water?
- How does this experiment relate to real-world water purification processes?

### Alternatives:

- Prepare the filtration system before the activity. Participants will just observe the filtration process and discuss it.
- For better observation of the effect of the different filter materials (gravel, sand and activated carbon), separate them into several bottles and observe the water after each filtration.

### Extra Experiments to Level Up the Water Filtration Game

If you want to take your participants' water purification skills to the next level, you can add these further experiments:

- **Water Quality Check:** Use pH strips or a conductivity meter to test how clean your water is before and after filtration. Drinking water should have a pH between 6.5 and 9.5.
- **Material Comparison:** Test different natural and household materials: cotton balls, wool, newspaper and see which one filters best.
- **DIY Distillation:** Try evaporating and condensing water to purify it - simple but effective.
- **Chlorination:** Add a few drops of bleach to disinfect the water.
- **UV Power:** Let sunlight or a UV light disinfect the water. To prove the disinfection, place water samples in dishes with agar jelly and use a microscope to observe bacteria before and after exposure.
- **Full Water Test:** Use pH test strips or a full water quality kit (can be ordered online) to check for chlorine, acidity, and other key factors available and described in the kit in the water before and after filtration. See which factors were affected by filtration and which not.